



Weston Solutions, Inc.
750 E. Bunker Ct. Suite 500
Vernon Hills, Illinois 60061
(847) 918-4000

EPA Region 5 Records Ctr.



286204

938867

February 19, 2008

Ms. Verneta Simon
On-Scene Coordinator
United States Environmental Protection Agency, Region V
77 West Jackson Boulevard, Fifth Floor
Chicago, Illinois 60604

Re: Deerfield Residential Mercury Spill
Deerfield, Lake County, Illinois
Technical Direction Document: S05-0001-0712-014
Document Control Number: 363-2A-ABNL
Work Order Number: 20405.012.001.0363.00

Dear Ms. Simon:

The United States Environmental Protection Agency (U.S. EPA) tasked the Weston Solutions, Inc., (WESTON®) Superfund Technical Assessment and Response Team (START) under Technical Direction Document (TDD) S05-0001-0712-014 to support U.S. EPA's emergency response at the Deerfield Residential Mercury Spill in Deerfield, Lake County, Illinois (the Site). The emergency response was initiated to mitigate immediate threats to human health, welfare, and the environment due to a mercury spill at a residence owned by Matthew and Michelle located at Ash Street, Deerfield, Lake County, Illinois (Attachment A, Figure 1).

SITE DESCRIPTION

The Site **Non-Responsive** is located in a residential area of Deerfield, Illinois (Attachment A, Figure 1). The single-story home has a living room; kitchen; two bedrooms; one study; one bathroom; an open loft above the second bedroom; a paved driveway; a detached, two-car garage, and front and back yards (Attachment A, Figure 2). The Site is bordered to the north, south, and west by residential properties, and to the east by a multi-story office building. The home is located **Non-Responsive**. The house is occupied by Mr. and Mrs. their two children, and a small dog.

BACKGROUND

On December 18, 2007, a mercury release was reported to the local poison control by **Non-Responsive**, a resident of the Site. Poison control recommended that she contact U.S. EPA. U.S. EPA duty officer, Leonard Zintak, contacted On-Scene Coordinator (OSC) Verneta Simon at 1930

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363-2A-ABNL

This document was prepared by Weston Solutions, Inc., expressly for U.S. EPA. It shall not be released or disclosed in whole or in part without the express, written permission of U.S. EPA.



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hours and filed an incident report with the National Response Center. According to the incident report, the mercury release was from a broken thermometer. On December 18, 2007, the three-year-old child of **Non-Responsive** was playing in his bedroom when he broke a mercury-containing medical thermometer. They noticed the release on the books that the child was reading and responded by vacuuming the carpeting. After researching mercury on the Internet, Mr. and Mrs. realized that their response was not appropriate and called poison control. They placed the remains of the broken thermometer into a sealable plastic bag and put the vacuum cleaner and books in garbage bags outside of the house.

At 2200 hours on December 18, 2007, OSC Simon and WESTON START personnel mobilized to the Site. Upon arrival, OSC Simon and WESTON START personnel, Jay Rauh, met with **Non-Responsive**. The expressed concern that their two children were exposed to elemental mercury. They have two children living at the house, a three-year-old and a one-year-old.

U.S. EPA and WESTON START entered the three-bedroom home at 2230 hours and conducted air monitoring with a Lumex[®] Mercury Vapor Analyzer (MVA). The heating, ventilation, and air-conditioning (HVAC) system in the house had been stopped by the residents, and the temperature in the living room and kitchen area was approximately 60° Fahrenheit (F). The maximum breathing zone mercury level detected in the living room was 12,581 nanograms per cubic meter (ng/m³) [at a temperature of 60°F] (Table 1). The child's bedroom door, to the room with the initial release, was closed with the window open, and the maximum breathing zone mercury level detected was 6,250 ng/m³ (at a temperature of approximately 55°F). The master bedroom door was closed, but there was an electrical heater running in the room. The maximum breathing zone mercury level detected was 29,067 ng/m³ (at a temperature of approximately 75°F). The heating, ventilation, and air conditioning (HVAC) system was located near the kitchen. The filter was screened, but the reading was not elevated over the background level in the room. At the request of the residents, the children and a small dog were screened by placing the Lumex MVA within two centimeters of their feet and clothing. The child- and dog-screening results were not elevated above the background level in the living room. The breathing zones of the exterior entryway (13,650 ng/m³) and study (12,250 ng/m³) were also screened. The vacuum cleaner that had been used to vacuum the mercury had been bagged and placed outside prior to the arrival of OSC Simon and WESTON START Rauh. The Agency for Toxic Substances and Disease Registry (ATSDR) recommends a limit of 1,000 ng/m³ in the breathing zone for residential occupancy and 10,000 ng/m³ for personal belongings. These levels were used as U.S. EPA action levels for the response and air monitoring results are compared to these levels in Attachment C, Table 1. Photographic documentation is provided in Attachment B.

OSC Simon recommended that the residents vacate the house until further characterization and removal activities were complete. She arranged for Dr. Michelle Watters, an ATSDR physician, to call the residents to address concerns about their children's health.



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The U.S. EPA conferred with Mr. [redacted] to determine if a removal contractor could be procured to remediate the mercury release at the Site. Mr. [redacted]'s homeowner's insurance policy excluded coverage for such a hazardous material release.

U.S. EPA OSC Simon initiated a fund-lead mercury clean-up at the Site on December 18, 2007. Mr. and Mrs. [redacted] elected to have U.S. EPA and their contractors conduct a removal due to insurance restrictions. On December 19, 2007, U.S. EPA mobilized its Emergency and Rapid Response Services (ERRS) contractor, Environmental Restoration (ER), to provide time-critical removal support based on the immediate threats to human health from the mercury vapors. Factors to be considered in determining the appropriateness of a potential Comprehensive Environmental Response, Compensation, and Liability Act removal action at a site are defined in the National Oil and Hazardous Substances Contingency Plan at 40 Code of Federal Regulations 300.415(b)(2). A summary of the factors applicable to the Site is presented below:

- Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances, pollutants, and/or contaminants that included mercury vapor levels as high as 29,067 ng/m³ – well above the 1,000 ng/m³ U.S. EPA residential cleanup criteria. The release posed a threat to four Site residents (2 adults and 2 children) and a dog, and potentially a threat to nearby residential properties, the local population, and environment, which could be exposed to mercury since elemental mercury was improperly disposed of in refuse receptacles and may have remained uncontrolled in and around the Site.
- There was a lack of availability and resources of other appropriate federal or state response mechanisms to respond to the release. Federal involvement was needed to address imminent endangerment to human health, welfare, and the environment posed by elevated mercury vapor concentrations at the residence.

EMERGENCY RESPONSE ACTIVITIES

The following removal activities took place at the Site.

December 19, 2007

U.S. EPA, WESTON START, and ERRS mobilized to the site on December 19, 2007. OSC Simon met WESTON START Rauh at the residence at 1200 hours and met with Mr. [redacted]. While his family was sleeping at another location, he set the Site HVAC system to 80°F with all windows closed. Rauh and Simon entered the house with a Lumex MVA. Breathing zone readings were as follows:

- Exterior entryway – 380 ng/m³



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- Living room – 5,750 ng/m³
- Kitchen – 5,754 ng/m³
- Child's bedroom – 9,782 ng/m³
- Master bedroom – 5,554 ng/m³
- Study – 5,274 ng/m³

ERRS, arrived at the Site at 1300 hours. The ERRS work crew consisted of one laborer plus a response manager (RM), Tobin Viehweg. ERRS conducted the following removal actions:

- Installed a negative air machine and opened windows to vent the house;
- Bagged personal items in the child's bedroom;
- Removed carpeting and carpet under-pad in the child's bedroom;
- Vacuumed all dirt, dust, and loose material under the carpet with a mercury vacuum;
- Bagged carpeting, bedding, mattress, and personal items from the child's bedroom;
- Placed all bagged items in a detached garage with a portable kerosene (bullet) heater;
- Closed the windows of the house and set the HVAC system to 80°F; and
- Loaded and transported bagged personal items, carpeting, and bedding with headspace readings above 10,000 ng/m³.

ERRS donned modified Level D personal protective equipment (PPE), which included Tyvek® coveralls, Tyvek® booties, and surgical gloves. After heating the bagged personal items to approximately 80°F, WESTON START Rauh screened the headspace. Several of the items, including the toy vacuum (10,890 ng/m³), wooden toys (26,780 ng/m³), mattress (13,251 ng/m³), pillow (28,651 ng/m³), blanket (958,890 ng/m³), and bedding (19,780 ng/m³) exceeded the ATSDR recommendation of 10,000 ng/m³ for personal belongings. ERRS disposed of these personal items.

At 1625 hours, when the temperature inside the house reached 77°F and ERRS had finished removing mercury-contaminated carpeting and personal items, WESTON START Rauh screened the residence with a Lumex MVA. Breathing zone readings were as follows:

- Exterior entryway – 38 ng/m³;
- Living room – 299 ng/m³;
- Child's bedroom – 293 ng/m³;



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- Master bedroom – 315 ng/m³;
- Study – 312 ng/m³;
- Kitchen - 277 ng/m³; and
- Bathroom – 311 ng/m³.

All screening results were below the recommended ATSDR level for occupancy of 1,000 ng/m³ mercury in the breathing zone. OSC Simon cleared the house for re-occupancy based on the readings from the Lumex MVA.

The mercury-contaminated debris that was removed (bedding, carpeting, carpet padding, shelves, clothes, toys, and personal items with headspace readings above 10,000 ng/m³) was transported by Republic Services, Inc., to Forest Lawn Landfill in Three Oaks, Michigan, (service approval #801025) for final disposal as non-hazardous, non-Department of Transportation (DOT)-regulated debris (Attachment D).

January 11, 2008

OSC Simon and WESTON START Rauh returned to the residence to conduct follow-up screening and verify the efficacy of the removal action. At 1300 hours, with Mrs. approval, WESTON START Rauh began screening the residence with a Lumex MVA. The indoor air temperature was 70°F. Breathing zone readings were as follows:

- Exterior entryway – 5 ng/m³;
- Living room – 0 ng/m³;
- Child's bedroom - 3 ng/m³;
- Master bedroom – 2 ng/m³;
- Study – 2 ng/m³;
- Kitchen - 3 ng/m³;
- Laundry/HVAC area – 3 ng/m³; and
- Bathroom – 2 ng/m³.

Follow-up Activities

OSC Simon discussed details on possible past uses of the residence with Mrs. Fierer. Mrs. reported that the previous owner (Daniel Andre) had used the house as a furniture-making shop called "Halstead Furniture" prior to her family moving in. She also reported that there was a yellow envelope labeled "mercury" taped to the west side of her garage when she and Mr. purchased the house.

Mrs. reported that she brought her children to a medical toxicologist for medical monitoring. She stated that the medical toxicologist informed her that the children's blood



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mercury was above average levels for that age group and that urine mercury was within a normal range, which suggested a dietary source of mercury. Dr. Watters concurred that this type of reading is typical of mercury from a dietary source. Dr. Watters relayed that subsequent monitoring of one of the children's blood and urine, after the parents reportedly restricted ingestion of potential dietary sources, indicated mercury levels in average ranges. (The CDC's National Health and Nutrition Examination Survey (NHANES) found that the 95th percentile for blood mercury in children between the ages of 1 to 5 during 1999-2002 was 2.21 micrograms per liter (Jones et al 2004 MMWR 53(43):1018-1020)).

U.S. EPA Civil Investigator (CI) Joseph Kawecky interviewed Mary Andre, the former wife of Mr. Andre. She stated that Mr. Andre worked as a custom cabinet maker out of their detached garage and that they did not use or store mercury in their house or garage.

Mr. Kawecky also interviewed Mr. Andre. Mr. Andre stated that he taped a sealed, unbroken vial of mercury in a padded envelope labeled "mercury" to the west side of the garage. When Mr. Andre replaced his HVAC system, he discovered the mercury switch inside the old thermostat. He could not find an appropriate means to dispose of it, so he left it with the house when he sold it. He believes that he informed Mr. and Mrs. [redacted] of its presence. He stated that he called the Occupational Safety and Health Administration (OSHA) and the local fire department, but they refused to dispose of it for him. He stated that the fire department instructed him to wait for a local household hazardous waste turn-in day. He also stated that he never used mercury for his business and that he is not aware of any other mercury on the property.

CONCLUSIONS AND RECOMMENDATIONS

As a result of the emergency response and time-critical removal activities described above, threats to human health, welfare, and the environment due to the mercury release at the Site have been mitigated. All visible mercury beads and contaminated items were collected, containerized, and disposed of offsite. Results of the ambient air screening at the residence met the U.S. EPA residential clearance criterion for mercury vapor of less than 1,000 ng/m³. No further action is recommended.

The preparation of this letter report serves as the final TDD deliverable, per the request of OSC Simon. All tasks pertaining to this TDD have been completed. If there are any questions or comments regarding this report, please do not hesitate to contact WESTON START at (847) 918-4000.

Very truly yours,
Weston Solutions, Inc.



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Jay Rauh
WESTON START Project Leader

Attachments:

- A – Figures
- B – Photo Log
- C – Data Table
- D – Waste Manifests

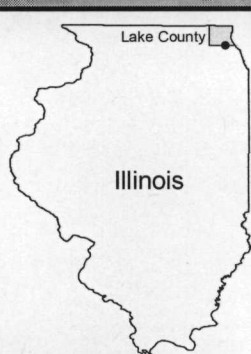
cc: Gail Stanuch, U.S. EPA Project Officer
Lisa Graczyk, Project Manager
WESTON START DCN File

ATTACHMENT A

FIGURES

Image Source:
GlobeXplorer, 2007-07-07

20820 Ash Street



Legend

0 1,000
Feet



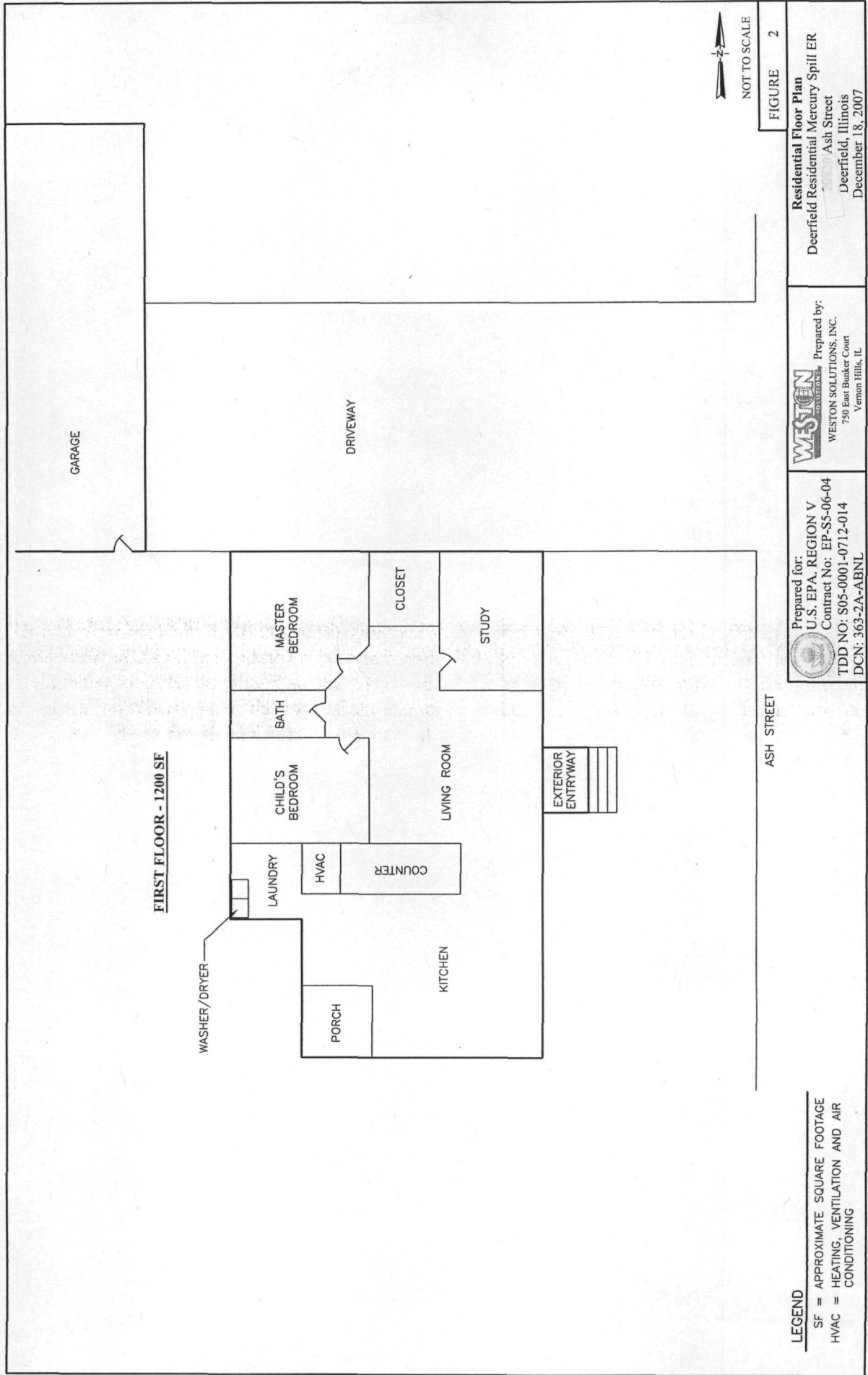
Prepared for:
U.S. EPA REGION V

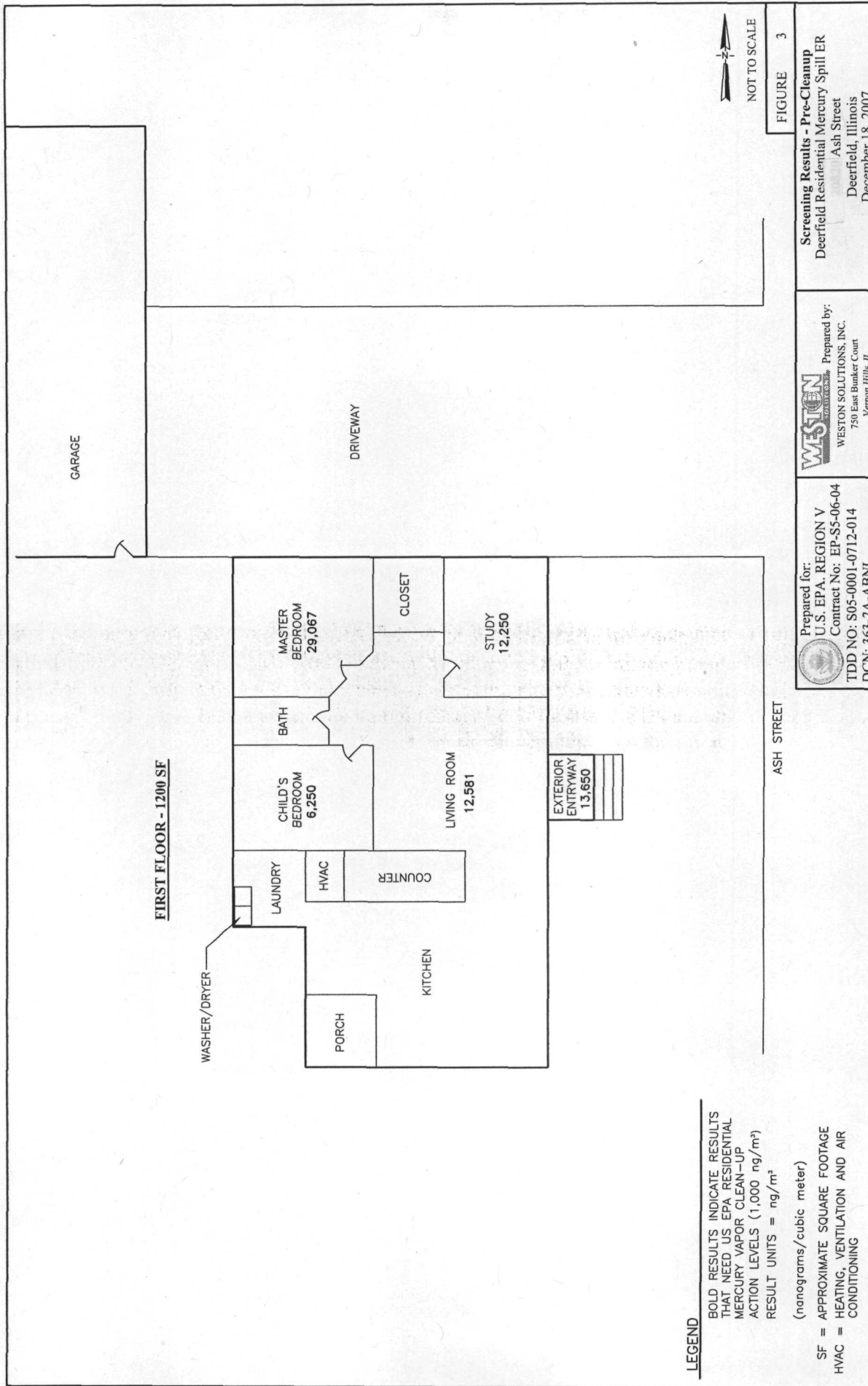
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TDD: S05-0012-0712-014
DCN: 363-2A-ABNL

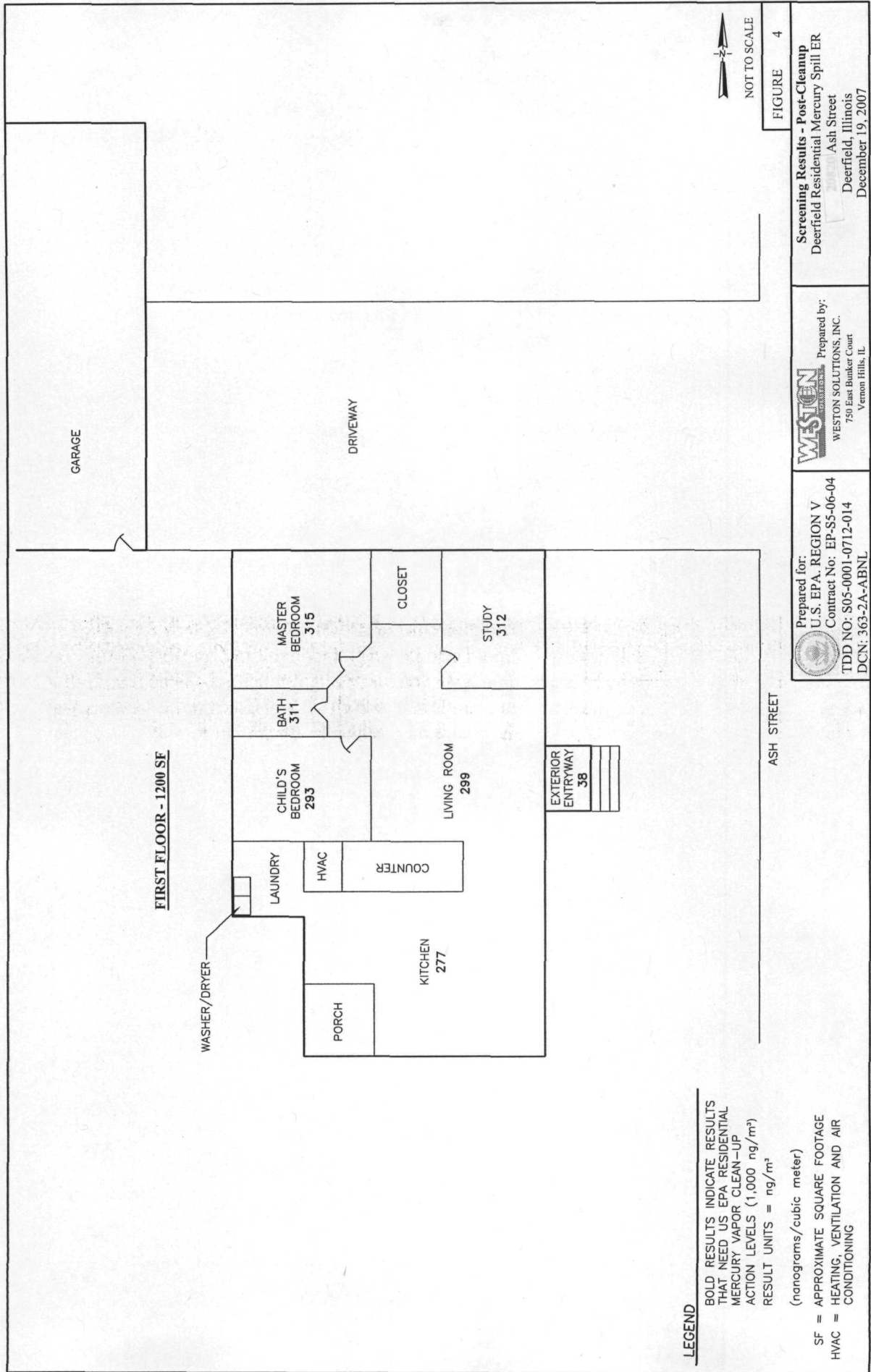


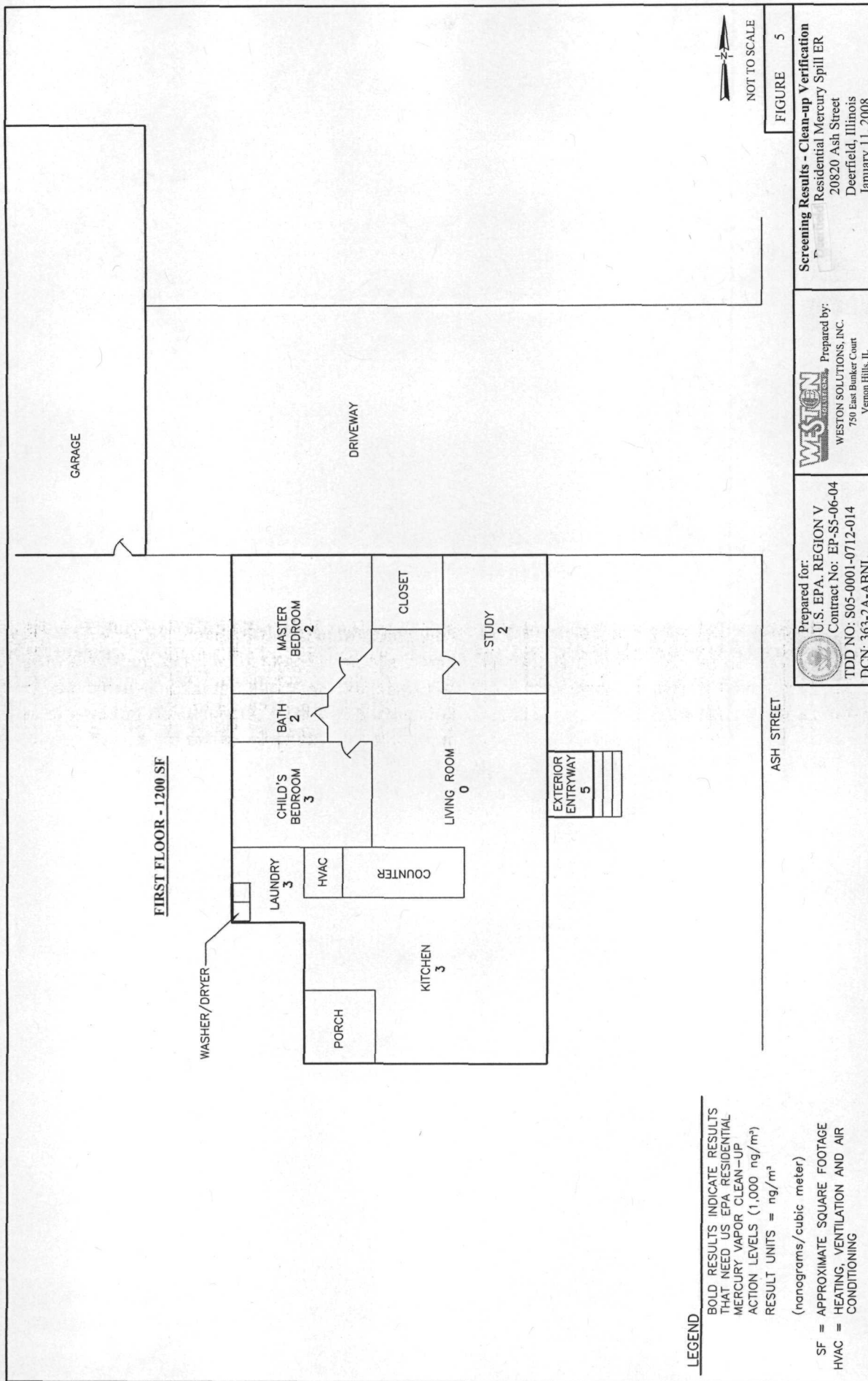
Weston Solutions, Inc.
750 E. Bunker Ct. Suite 500
Vernon Hills, IL 60061

Figure 1
Site Location Map
20820 Ash Street, Deerfield, Illinois
Deerfield Mercury Response
Deerfield, Illinois









LEGEND

BOLD RESULTS INDICATE RESULTS THAT NEED US EPA RESIDENTIAL MERCURY VAPOR CLEAN-UP ACTION LEVELS (1,000 ng/m³)

RESULT UNITS = ng/m³ (nanograms/cubic meter)

SF = APPROXIMATE SQUARE FOOTAGE

HVAC = HEATING, VENTILATION AND AIR CONDITIONING

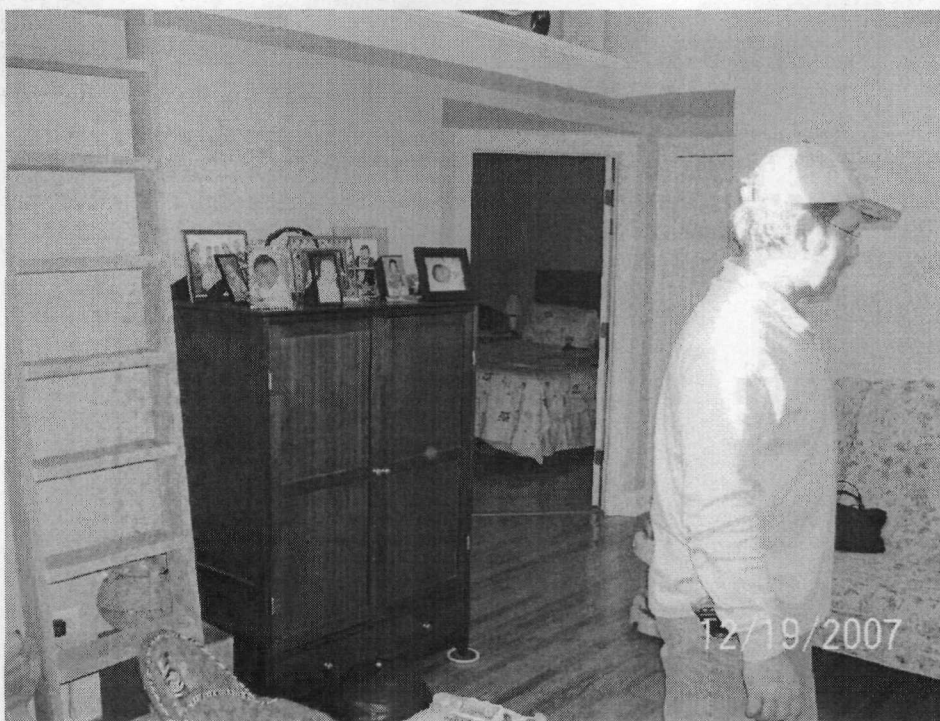
ATTACHMENT B

PHOTO LOG



Site: Deerfield Residential Mercury Spill
Photo Number: 1
Direction: South
Subject: Broken thermometer, the spill's source

Date: December 19, 2007
Photographer: Jay Rauh



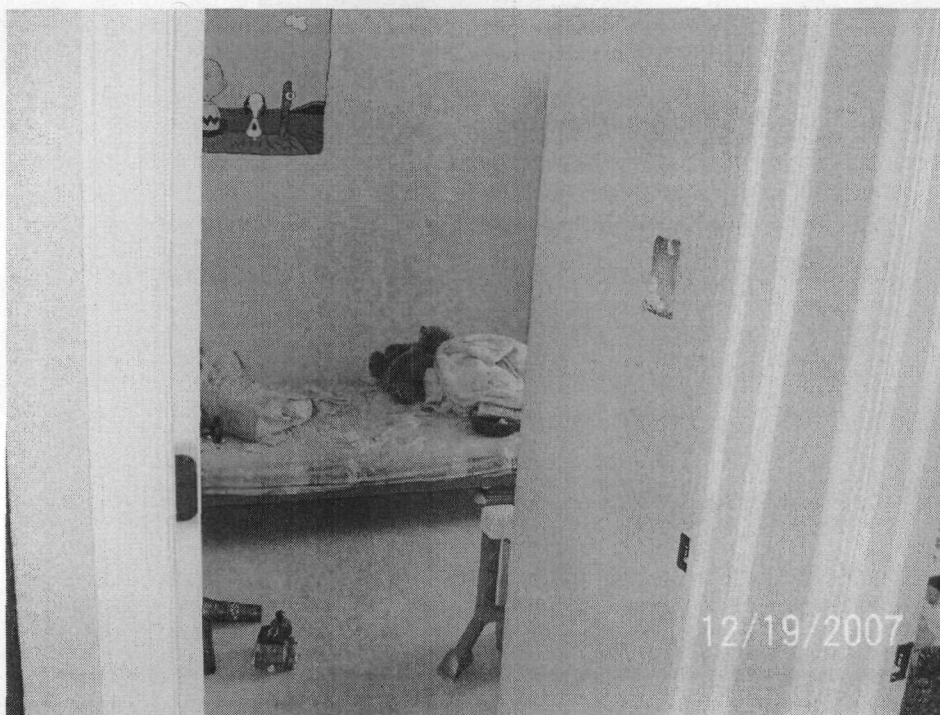
Site: Deerfield Residential Mercury Spill
Photo Number: 2
Direction: Northwest
Subject: The living room, master bedroom in background

Date: December 19, 2007
Photographer: Jay Rauh



Site: Deerfield Residential Mercury Spill
Photo Number: 3
Direction: West
Subject: Kitchen

Date: December 19, 2007
Photographer: Jay Rauh



Site: Deerfield Residential Mercury Spill
Photo Number: 4
Direction: South
Subject: Child's room in the vicinity of the spill

Date: December 19, 2007
Photographer: Jay Rauh



Site: Deerfield Residential Mercury Spill

Photo Number: 5

Direction: East

Subject: Spill area (the vacuum pictured is a toy and was not used in the parents' cleanup)

Date: December 19, 2007

Photographer: Jay Rauh



Site: Deerfield Residential Mercury Spill

Photo Number: 6

Direction: West

Subject: Other items in the child's room

Date: December 19, 2007

Photographer: Jay Rauh



Site: Deerfield Residential Mercury Spill
Photo Number: 7
Direction: East
Subject: Living room

Date: December 19, 2007
Photographer: Jay Rauh



Site: Deerfield Residential Mercury Spill
Photo Number: 8
Direction: South
Subject: Emergency and Rapid Response Services (ERRS) bagging items from the child's room

Date: December 19, 2007
Photographer: Jay Rauh



Site: Deerfield Residential Mercury Spill

Photo Number: 9

Direction: South

Subject: ERRS removing carpeting from the child's room

Date: December 19, 2007

Photographer: Jay Rauh



Site: Deerfield Residential Mercury Spill

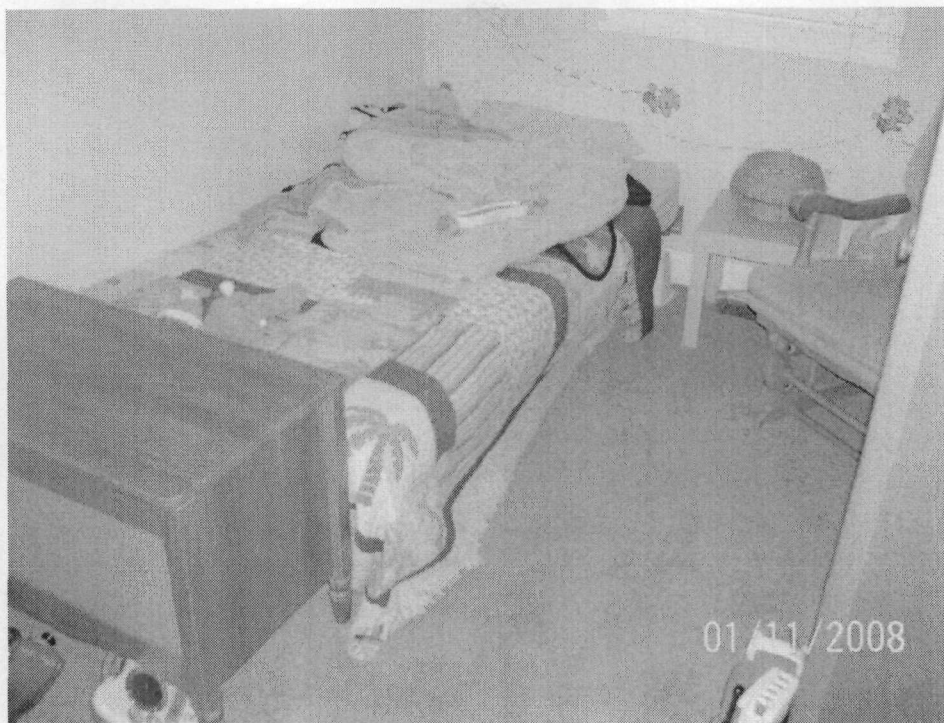
Photo Number: 10

Direction: Southwest

Subject: Mercury-contaminated debris awaiting transportation and disposal

Date: December 19, 2007

Photographer: Jay Rauh



Site: Deerfield Residential Mercury Spill

Photo Number: 11

Date: January 11, 2008

Direction: West

Photographer: Jay Rauh

Subject: The child's room with new carpeting (furniture was rearranged after new carpeting was installed)



Site: Deerfield Residential Mercury Spill

Photo Number: 12

Date: January 11, 2008

Direction: South

Photographer: Jay Rauh

Subject: The child's room with new carpeting (furniture was rearranged after new carpeting was installed)

ATTACHMENT C

DATA TABLE

Deerfield Residential Mercury Spill
Table 1
Mercury Vapor Levels Recorded with a Lumex MVA

Screening Location:	1 Ash St, Deerfield, Illinois				
Screener/Affiliation:	WESTON START member, Jay Rauh				
	Breathing Zone Mercury Vapor (ng/m³)				
Room	Date:	December 18, 2007	December 19, 2007	December 19, 2007	January 11, 2008
	Time:	2230	1220	1625	1325
Exterior Entryway		13,650	380	38	5
Living Room		12,581	5,750	299	0
Kitchen		NS	5,754	277	3
Laundry/HVAC Area		NS	NS	NS	3
Child's Bedroom		6,250	9,782	293	3
Master Bedroom		29,067	5,554	315	2
Study		12,250	5,274	312	2
Bathroom		NS	NS	311	2
Background		46	3	3	3

Notes:

Bold results indicate screening levels exceeding the United States Environmental Protection Agency residential mercury vapor clean-up action level of 1,000 ng/m³
HVAC – Heating ventilation and air conditioning
MVA – mercury vapor analyzer
NA – not available
ng/m³ – nanograms per cubic meter
NS – not screened
START – Superfund Technical Assessment and Response Team
WESTON – Weston Solutions, Inc.

ATTACHMENT D
WASTE MANIFESTS



NON-HAZARDOUS WASTE MANIFEST

GENERATOR INFORMATION

Generator Name: USEPA Billing Name: Environmental Restoration
Address: 77 West Jackson Blvd. SE-5J Address: 16660 Canal Street
City: Chicago County: Cook City: South Holland County: _____
State: Illinois Zip: 60604 State: Illinois Zip: 60473
Site Location (if different): Hg Cleanup-20820 Ash Street; Deerfield, Illinois 60015

CUSTOMER/BILLING INFORMATION

Republic Services Approval #	Description of Waste	Volume/Weight	Expiration Date	Container Type
801025	Debris (plastic, wood, metal and PPE)		1/07/2009	
	Mercury Clean up			

*Attach Additional Sheet if necessary

I hereby certify that the above described materials are non-hazardous wastes as defined by 40 CFR 261 or any applicable state law. Further, that the above named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.

Generator/Authorized Agent Name

Signature

Date Shipped

TRANSPORTER INFORMATION

Transporter Name: _____ DOT# _____
Transporter Address: _____ Truck Number: _____
_____ Phone Number: _____

I certify no hazardous waste or other regulated substance was knowingly introduced to the waste while in my custody. The waste transported in this vehicle is the waste identified above, to the best of my knowledge.

Name of Authorized Agent

Signature

Date Delivered

DISPOSAL SITE INFORMATION

Site Name: Forest Lawn Landfill Phone No. 269-756-9252
Site Address: 8230 West Forest Lawn Road; Three Oaks, Michigan 49128

I hereby acknowledge receipt of the above described materials.

Name (Print or Type)

Signature

Date Received

Form SW02 (2003)

MDEQ
Department of Environmental Quality, Waste and Hazardous Materials Division

UNIFORM SOLID WASTE RECORD

Completion of this form fulfills the documentation requirements of Section 11526a(1)(a) of Part 115, Solid Waste Management, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, for certain solid waste generated outside of Michigan to be disposed in Michigan landfills.

Part 1 of this form shall be completed by the generator or the hauler of the solid waste load to be disposed of in Michigan. Part 2 of this form shall be completed by the Michigan landfill to which the solid waste is delivered. The landfill shall retain a copy for their records and make such copy available for inspection.

PART 1: GENERATOR, HAULER, AND WASTE INFORMATION	
GENERATOR AND HAULER INFORMATION	SOLID WASTE LOAD BEING DOCUMENTED
GENERATOR NAME: USEPA/Deerfield, Illinois	HAULER VEHICLE/TRAILER # OF VEHICLE DELIVERING WASTE TO MICHIGAN:
GENERATOR MAILING ADDRESS: 77 West Jackson Blvd. SE-5J	VOLUME (CUBIC YARDS) OR WEIGHT (TONS) OF WASTE TRANSPORTED FOR DISPOSAL IN MICHIGAN (INDICATE UNIT OF MEASURE): 1 TON = 2,000 LBS.
CITY: STATE/PROVINCE: ZIP/MAIL CODE: Chicago, Illinois 60604	DESCRIPTION OF WASTE: Approval #801025 Expiration Date 1/07/2009 Debris (wood, plastic, metal and PPE) from mercury clean up. Debris does not contain elemental mercury
GENERATOR PHYSICAL ADDRESS: 20820 Ash Street	
CITY: STATE/PROVINCE: ZIP/MAIL CODE: Deerfield, Illinois 60015	
GENERATOR TELEPHONE NUMBER (INCLUDING AREA CODE): 708-333-9915-Environmental Restoration	I certify that the above indicated solid waste load is composed of a uniform type of item, material, or substance, other than municipal solid waste incinerator ash, that meets the requirements for disposal in a Michigan landfill. I also certify that the information contained on this form, to the best of my knowledge and belief, is true.
NAME OF HAULER DELIVERING WASTE TO LANDFILL:	
HAULER MAILING ADDRESS:	GENERATOR AUTHORIZED SIGNATURE:
CITY: STATE/PROVINCE: ZIP/MAIL CODE:	PRINT NAME:
HAULER TELEPHONE NUMBER (INCLUDING AREA CODE):	DATE:
PART 2: LANDFILL INFORMATION	
LANDFILL NAME: Forest Lawn Landfill	LANDFILL DESIGNATION FOR CERTIFIED LOAD (Receipt #, etc.):
LANDFILL PHYSICAL ADDRESS: 8230 West Forest Lawn Road	COMMENTS REGARDING LOAD LISTED ABOVE:
	LANDFILL DISPOSAL DATE:

CITY:	STATE:	ZIP CODE:	LANDFILL AUTHORIZED SIGNATURE:
Three Oaks, Michigan	49128		
LANDFILL TELEPHONE NUMBER (INCLUDING AREA CODE):			
269-756-9252			
			PRINT NAME: